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STATEMENT OF BASIS SOLID WASTE MANAGEMENT UNIT 5 AIRCRAFT FIRE FIGHTING TRAINING FACILITY MILLINGTON SUPPACT TN

Statement of Basis
Solid Waste Management Unit 5
Aircraft Fire Fighting Training Facility
Naval Support Activity Mid-South
Millington, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, and remedy selected for Solid Waste Management Unit (SWMU) 5, Aircraft Fire Fighting Training Facility, (AFFTF) Naval Support Activity Mid-South, Millington, Tennessee (Figure 1). A significant portion of NSA Mid-South's Northside was transferred to the City of Millington, including SWMU 5.

SPECIFIC SITE INFORMATION

SWMU 5 was used from 1949 until October 1996 to simulate burning aircraft and fire-rescue situations. Underground pipes transferred jet fuel from underground storage tanks to two bermed concrete mats with aircraft cockpits, where students ignited the fuel and then extinguished it with high-pressure water and/or foam sprays. Wastewater and fuel drained to a 5,000-gallon oil-water separator where fuel was reused and wastewater was sent to the sanitary sewer. Potential impacts associated with spills, leaking tanks, and ruptured fuel lines, resulted in the site being designated as Solid Waste Management Unit (SWMU) 5, which required RCRA corrective action.

SUMMARY OF CONTAMINANT EVALUATION

The former AFFTF contained two 75-foot-diameter fire burn mats, five fuel tanks (aboveground and below ground), an oil-water separator, and associated piping. A 1990 RCRA Facility Assessment (RFA; ERC/EDGe, 1990) concluded that a history of spills, overflows, and leaking tanks warranted that the site undergo further evaluation (ERC/EDGe, 1990).

Soil and groundwater sample locations from the RFI (Figure 2) and a 1992 underground storage tank investigation (Figure 3) were the basis for the site evaluation and are provided in and, respectively. A summary of the number of samples collected from each media is provided below with a discussion of the chemicals detected above health-based screening criteria.

Soil

Fourteen surface and 29 subsurface soil samples were collected to evaluate potential impacts to site soil. As indicated in Table 1, contaminants identified above USEPA's risk-based concentration (RBC) criteria during the RFI and UST investigation consisted of the volatile organic compounds (VOCs) benzene and methylene chloride; the pesticide dieldrin (applied aerially over the base in the 1950s and 1960s); the semi volatile compound (SVOC)

benzo(a)pyrene, which is commonly associated with vehicle exhaust; and finally dioxin, a by-product associated with burning chlorine-based chemical compounds. As indicated in the table and shown on Figure 2, some of these sample locations coincide with locations where soil removals have since taken place, therefore they are no longer present at the site.

Table 1
Surface-Soil Contaminants (Max) Exceeding
Risk-Based Screening Criteria (ppb)[a]

Sample Location	Analyte	Result	RBC-Res[b]	RBC-Ind[b]
B-15*	Benzene	110	22	200
B-15*	Methylene chloride	120J	85	760
05S007	Benzo(a)pyrene	150	87	780
05SB0003	Dieldrin[c]	290J	40	360
005S001*	Dioxin	0.037	0.0043	0.038

Notes: [a] Units of parts per billion
[b] Denotes risk-based concentrations (RBCs), either residential (Res) or industrial (Ind); taken from *Risk-Based Concentration Table,* October 7, 1999 (USEPA, 1999).
[c] Only dieldrin detections above the background reference concentration (262 ppb) and the USEPA's RBC screening values are listed on the table.
* Denotes sample location that was later removed through tank closure or VCA.

Voluntary Clean-Up Actions (VCAs) were implemented by the Navy to remove petroleum contaminated soil identified during the RFI. One was completed in August 1997 by U.S. Army Corps of Engineers to remove the oil-water separator (EnSafe, 1998) and the second was in November of the same year to address contamination beneath the fire mat and the fire extinguisher pits (EnSafe, 1999a). Collectively, these two VCAs removed 6,100 cubic yards of petroleum contaminated soil. As indicated on Figure 3, the area surrounding the most contaminated well (FFMW-8) was included in the removal actions. All tanks, piping, and structures that could be a possible source of contamination have been similarly removed from the site. Effectiveness sampling showed that all constituents listed in Table 1 were below relevant action levels.

Groundwater

Two groundwater units were evaluated as part of the SWMU 5 RFI; groundwater in the shallower clay and silt loess deposits (approximately 15 feet below land surface) and that in the sand and gravel fluvial deposits (approximately 35 feet in depth). Since the groundwater beneath the Northside of the base has been designated as a separate area of concern (Area of Concern A), which is currently undergoing corrective measures, this groundwater unit is excluded from the SWMU 5 SB. Therefore the below groundwater discussion pertains only to the loess groundwater.

Loess Groundwater: Three UST and five RFI monitoring wells were sampled to characterize the loess groundwater. Table 2 lists sample locations and contaminants that exceeded either a USEPA screening value and/or a regulatory drinking water standard.

Monitoring well FFMW-8 contained 3,900 parts per billion (ppb) of benzene, well above the 5 ppb regulatory threshold and the most impacted well at the site. The source for this contamination was speculated to be the former fire extinguisher pits, northeast of the monitoring well, prompting the removal of soil over a 60-square-foot area through a VCA (EnSafe, 1999a). Methylene chloride was also detected in monitoring well FFMW-8 at 31 milligrams per liter (mg/l) which is above the 5 mg/l Maximum Contaminant Level (MCL). Additionally, Arsenic was detected at 159 mg/l which is above the 10 mg/l MCL. Initial indications from a monitoring event of replacement well FFMW-8 indicated the removal action was effective, as groundwater contaminants were absent in additional sampling events.

Lead was detected in monitoring well FFMW-5 at 37.7 milligrams per liter (mg/l) which is above the 14 mg/l Maximum Contaminant Level (MCL), antimony was detected in FFMW-5 at 64.8 mg/l which is above the 6 mg/l MCL, and beryllium was detected in monitoring well FFMW-5 at 4 mg/l which is at the 4 mg/l MCL. Cadmium was detected at 18.1 mg/l which is above the 5 mg/l MCL. Because these metals were not detected during a subsequent sampling event, the original exceedances were attributed to turbidity associated with the loess groundwater.

Table 2
Maximum Contaminants in Loess Groundwater
above Screening/Regulatory Criteria (ppb)

Sample Location	Analyte	Result	MCL[a]	RBC-Tap Water[b]
FFMW-5	Lead	37.7	15[c]	DNE
FFMW-5	Antimony	64.8	6	15
FFMW-5	Beryllium	4	4	1.3
FFMW-7	EPH[d]	1,000	1,000[e]	DNE
FFMW-8*	Benzene	3,900	5	0.36
FFMW-8*	Methylene Chloride	31	5	4.1
FFMW-8*	Arsenic	159	10	0.045

Notes: [a] Maximum Contaminant Levels (MCLs) in drinking water are from the *Drinking Water Regulations and Health Advisories* (USEPA, 1996)
[b] Tap water RBC is from the *Risk-Based Concentration Table*, 1999 (USEPA, 1998)
[c] Treatment Technology Action Level
[d] Extractable petroleum hydrocarbons
[e] TDEC Division of Underground Storage Tanks Cleanup Level for total petroleum hydrocarbons in a non-drinking water aquifer
* Monitoring well removed during VCA and replaced with MW-8a, which was subsequently sampled and shown to have concentrations below the USEPA's and TDEC's actionable levels

SELECTED REMEDY

There are no site-related contaminants above relevant action levels. Therefore, no further action is the recommendation for SWMU 5, Fire Fighting Training Facility. Contamination in the fluvial aquifer is being addressed as part of AOC-A, North Side Groundwater.

REFERENCES

EnSafe Inc. (2005). *Technical Memorandum — Supplementary Screening Level Ecological Risk Assessment, SWMU 5 — Aircraft Fire Fighting Training Facility, NSA Mid-South.* Memphis, Tennessee.

EnSafe Inc. (1998). *Oil-Water Separator Removal Aircraft Fire Fighting Training Facility — SWMU 5. Technical Memorandum.* Memphis, Tennessee.

EnSafe Inc. (1999a). *RCRA Facility Investigation Report; Aircraft Fire Fighting Training Facility — SWMU 5. Revision 03. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

EnSafe Inc. (1999b). *Voluntary Corrective Action Report; SWMU 5 — Fire Mat 305 and Fire Extinguisher Pits (005G08LS Area); SWMU 60 (Northside Landfill); North Fuel Farm; Former Building N-6 (Underground Waste Tank); Revision 01. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

EnSafe Inc. (2003). *Recommendation for Site Closure; Aircraft Fire Fighting Training Facility — SWMU 5. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

EnSafe/Allen & Hoshall. (1992). *Environmental Assessment Report, Tank Systems 1489 and 1508, Aircraft Fire Fighting Training Facility, Naval Air Station Memphis, Millington, Tennessee*. Memphis, Tennessee.

ERC/EDGe. (1990). *RCRA Facility Assessment (RFA) NAS Memphis, Millington, Tennessee*. Knoxville, Tennessee.

TDEC. (2003). TDEC Division of Solid Waste letter to Jim Reed with U.S. Navy. May 8, 2003. TDEC, Memphis, TN.

USEPA. (2002). *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* USEPA, 2002.

USEPA. (2003). USEPA letter to Jim Reed with U.S. Navy. June 30, 2003. USEPA, Atlanta, Georgia.

FIGURES FOR SWMU 5

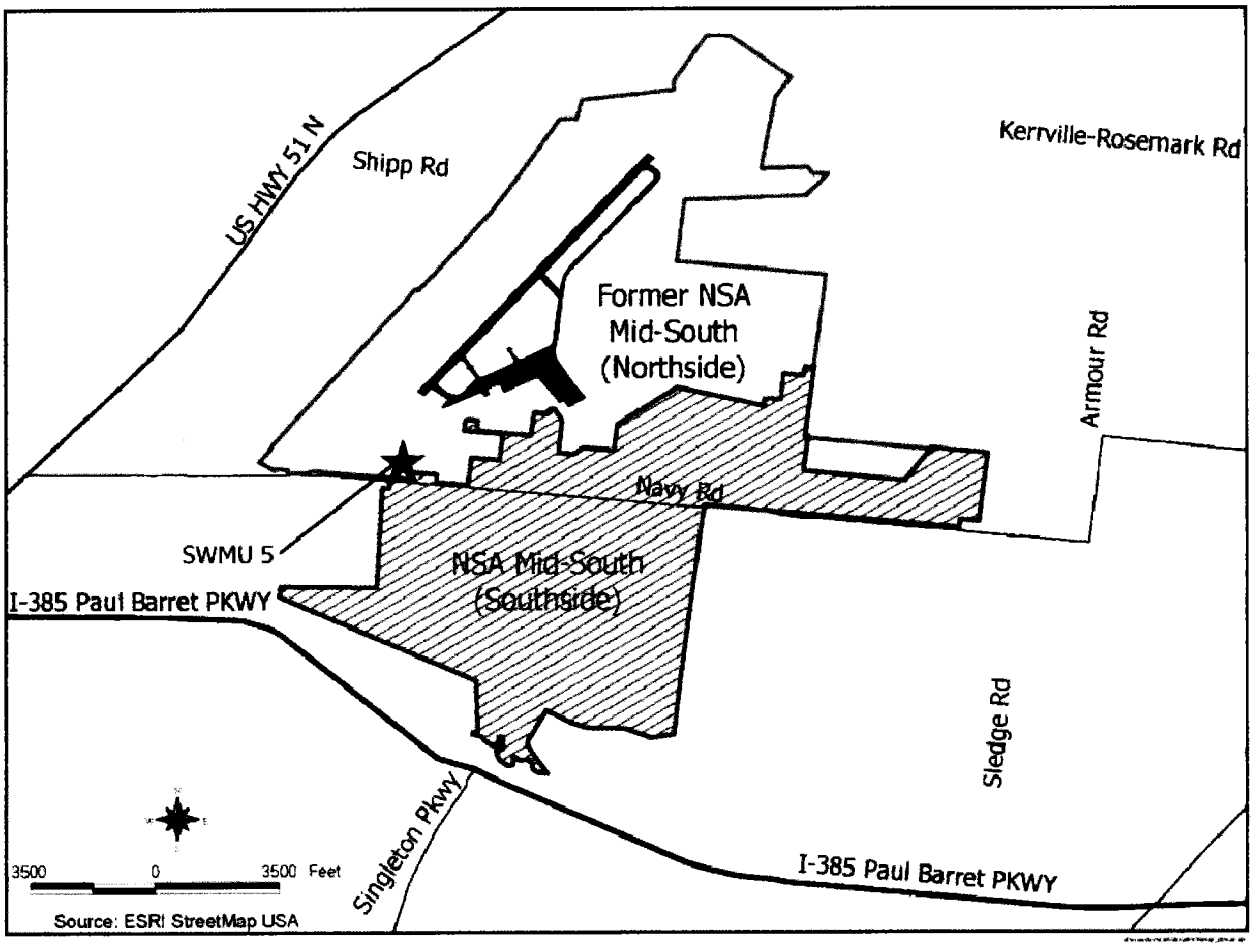
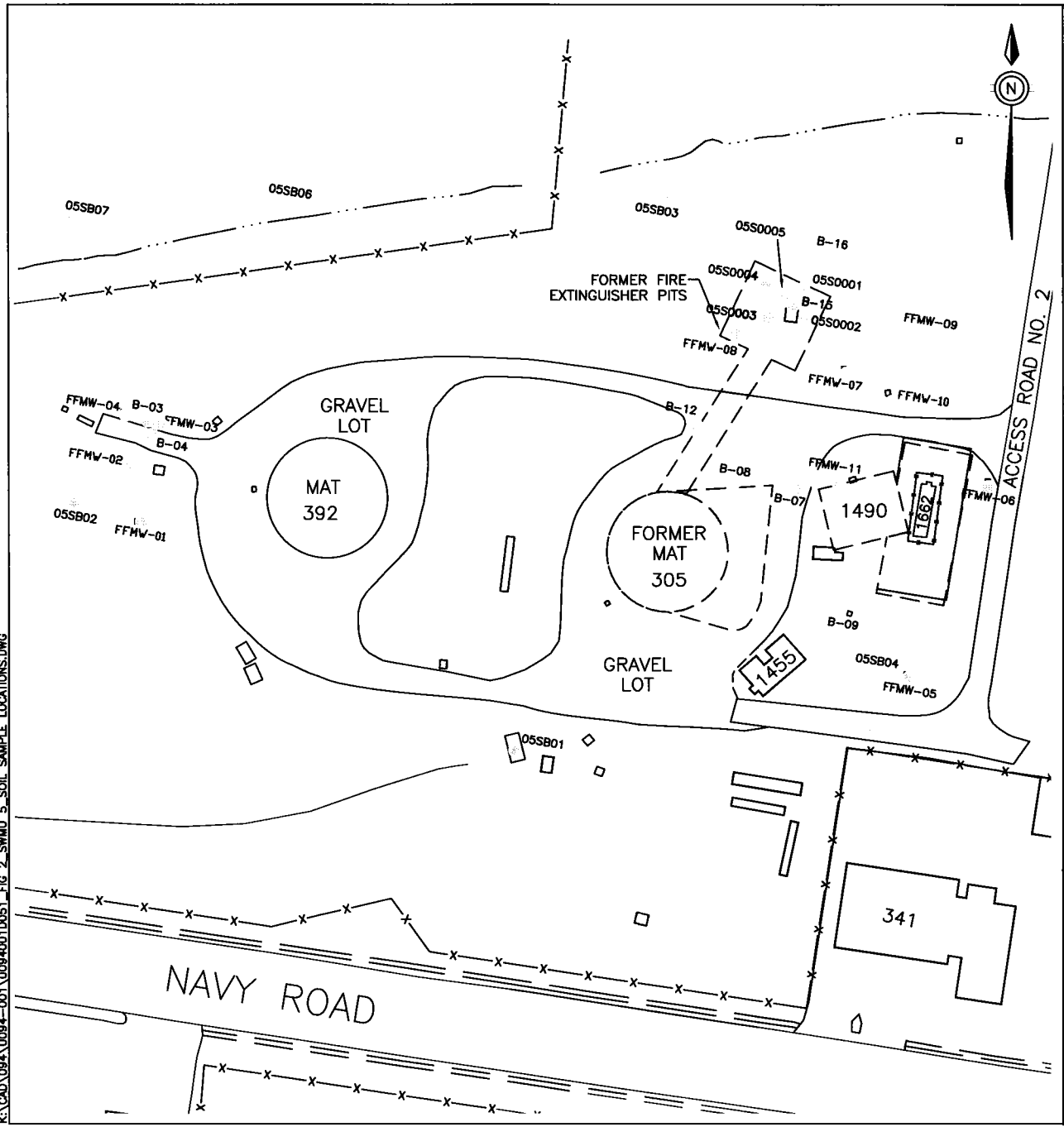


Figure 1: SWMU 5 Location at NSA Mid-South, Millington, Tennessee
Aircraft Fire Fighting Training Facility



AREA OF INTEREST

LEGEND

- CULVERT
- DITCH LINE
- STREAM LINE
- B-16 – UST INVESTIGATION SOIL SAMPLE
- AREAS REMOVED DURING VOLUNTARY CORRECTIVE ACTION (VCA) AND TANK CLOSURES
- 05SB03 – RFI SOIL SAMPLE
- NSA MID-SOUTH BOUNDARY
- AREA OF INVESTIGATION

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FIGURE 2
SWMU 5 STATEMENT OF BASIS
SOIL SAMPLE LOCATIONS

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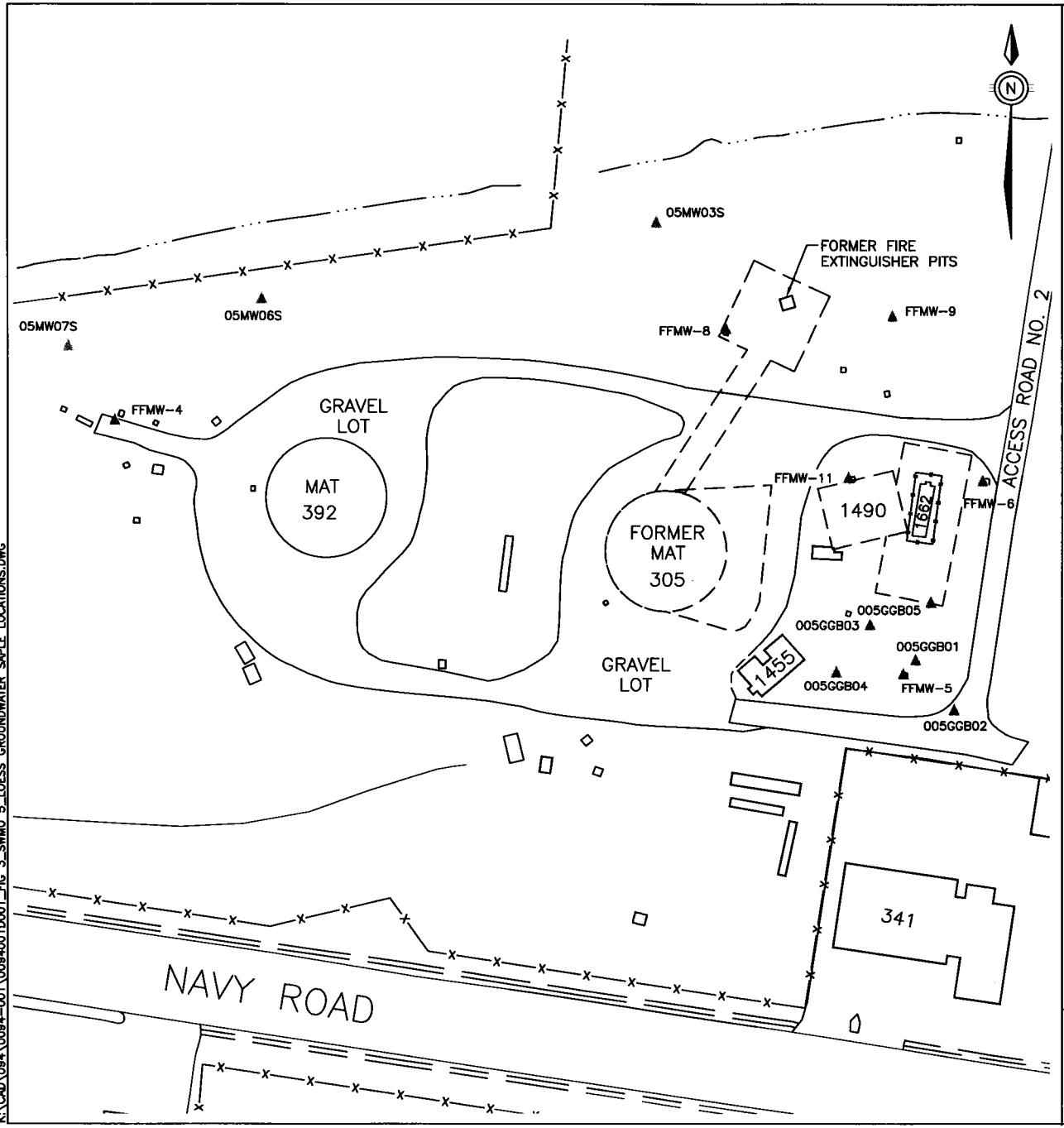

AREA OF INTEREST

LEGEND

- ▲ – LOESS GROUNDWATER SAMPLE LOCATION
- – – – AREAS REMOVED DURING VOLUNTARY CORRECTIVE ACTION (VCA) AND TANK CLOSURES.
- ——— – NSA MID-SOUTH BOUNDARY
- ——— – AREA OF INVESTIGATION

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FIGURE 3
SWMU 5 STATEMENT OF BASIS
LOESS GROUNDWATER
SAMPLE LOCATIONS

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K:\CAD\094\0094-001\00840010001_FIG 3_SWMU 5_LOESS GROUNDWATER SAPLE LOCATIONS.DWG